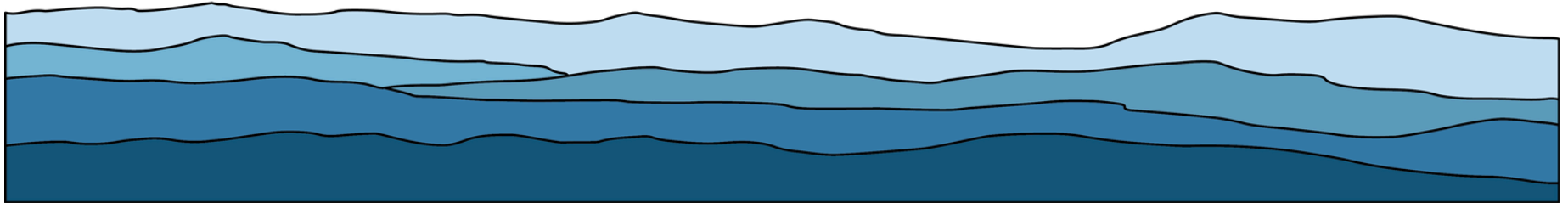


HIGHLANDS IN CHEMISTRY SEMINAR SERIES



Professor Neal P. Mankad

University of Illinois Chicago

“Radical and Bioinspired Approaches in Main Group and Transition Metal Catalysis”

The advancement of non-precious metal catalysis depends critically on discovering new reaction pathways and harnessing unusual oxidation states of earth-abundant metals. In this seminar, I will describe our recent work in two areas: (a) the rational design of molybdenum-based catalysts inspired by biological C–H hydroxylases, and (b) the exploration of aluminum(II) chemistry for small molecule activation.

In the first part, I will outline our efforts to develop structural and functional mimics of Mo-dependent hydroxylases such as xanthine oxidase and ethylbenzene dehydrogenase. These studies aim to generate catalysts that can hydroxylate C–H bonds in complex molecules with complementary site selectivity to existing technologies.

In the second part, I will highlight our discovery of Al–Fe bond homolysis in heterobimetallic complexes as a route to Al-based radicals—formally Al(II) species—that exploit strain-induced biphilicity or redox non-innocence. These properties enable new pathways for small molecule activation. I will also discuss our use of data science tools to guide the development of catalytic C–O bond functionalization reactions involving radical mechanisms.

February 6, 2026

2:30 PM ET

Hahn Hall North 140